Managing Risk in Supply Chain: 
A Model for the Classification of Potential Threats to Efficient Supply Chain Operation

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ABSTRACT

This article resulted from our study of 3 manufacturing centric supply chain operations in Singapore through 4 iterations of Action Research (AR) guided by Gowin’s V (Rachan, 2007). Although, there is substantial volume of literature on the topic of Supply Chain Management, it came to our attention during the literature review stage of research process, that major concentration of literature was in SCM design and optimization or supply chain performance benchmarking. Almost all of the literature on Risk issues was found to be focused on Security matters. This study was conducted to identify the main process flows in a Supply Chain. Key characteristics were derived from these process flows. From these key characteristics of the process flow, constraints were identified as a “class” to categorize all potential threats and problems. Thus the potential threats and problems classified are actionable and within the span of control, of the member supply chain network entities. This Model for classification will enable an integrated approach to (i) problem structuring, (ii) problem solving and (iii) learning on potential threats and problem to efficient supply chain operations. In today’s intense competitive market environment, efficient supply chain operations make the difference between profit and growth vs. Loss and closure. [Article copies are available for purchase from InfoSci-on-Demand.com]

Keywords: Complexity; Constraints; Equivocality; Risk; Uncertainty; Variability; Workflow

INTRODUCTION

Risk management in Supply Chain operations is clearly of significant interest to production companies, intermediaries and consumers. However, most current literature on Risk in Supply Chain is directed at the Security aspect of the Supply Chain operations, especially after “9/11“ terrorist attacks in USA and “Bird Flu" or “SARS“ epidemic in Asia. A model for the classification and consequential contingency plans making to be in “readiness” for such potential threats to efficient supply chain operations becomes urgent and necessary with the increase in “Outsourcing” and “Globalisation” of businesses.

Risk management in the supply chain does not equate to disaster response only. Rather, it
means keeping an increasingly complex process moving efficiently at the lowest total cost and without compromising the quality of the product or customer satisfaction. Whilst slippage in efficiency will have an adverse impact on financials in the short term. If such slippages persist frequently in the Supply Chain, then over the long term, the future of the company will be at stake. Customers may look for alternative sources or shift to substitute parts.

This article is directed at problem structuring (Rosenhead & Mingers, 2001) and identifying the class of risk based on characteristics of the constraints likely to threaten the efficient supply chain operations. Once identified, appropriate risk mitigation strategies can be applied to resolve potential threats or problems. By means of this model, managers involve in the supply chain planning and operations can be educated and trained in handling exceptions as well as major disasters in a formal manner. This formal approach to resolution of problems both current and in the foreseeable future helps communication between different autonomous entities in the supply chain network. Information flow in the supply chain is key to ensure efficient operations.

The process-oriented model proposed is a useful tool to educate and guide managers involved in supply chain operations, on the 4 main process flows, interactions and relationships. This knowledge will then empower the manager to determine a course of action, that will be most appropriate for; (i) addressing the problem at hand, (ii) understanding the impact of his actions on the related process flow, (iii) communicating the same to all other parties involved in a structured manner. It is not the objective of this article to provide specific solution to all kinds of risk in supply chain operations. This article is also not about a method for supply chain performance or maturity level measurement, as this has been sufficiently addressed in the current literature on supply chain (de Waart, 2006; Geary, Childerhouse & Towill, 2002). We also did not attempt to build mathematical or quantitative models, as the sites studied revealed that most manager involve in risk mitigation were not willing to go beyond their knowledge of Excel Spreadsheets. It is for the same reason this article is not about advance SCM design and planning optimization algorithms (Tang, 2006).

Finally, we did not proposed a Strategic, Operational and Tactical approach to risk mitigations (Juttner, Peck & Christopher, 2003). Supply chain management has remained challenging because unlike an organization, such networks not only have a large number of concurrent components (Suppliers, Entities, Plants, Distribution Centers, Shipment agencies, etc); but these components can interact asynchronously to create an exponential number of possible outcomes. There is no CEO who owns the supply chain from end-to-end like an enterprise. The need to coordinate the behavior of these autonomous entities to maintain coherence in the network adds considerable complexity. Such coordination involves dynamic temporal relations between events occurring at different entities (Peterson, Mannix, Tuttle & Day, 2003; Hau, Padmanabhan, & Whang, 1997). Resulting in a large number of messages and the response to them. Trying to structure all problems into Strategic, Operational and Tactical become prohibitive for the supply chain manager.

**ACTION RESEARCH (AR) GUIDED BY GOWIN’S V**

In our search for prospective organizations in which to conduct the research, we visited a number of organizations in Singapore with the support of Singapore Manufacturer’s Federation (SMaF). We found no organization having any formal means of risk mitigation in supply chain operations. This virtually eliminated the possibility of using non-interventionist research approaches, such as case or survey research. This basically left us with two alternative research approaches to choose from: a) Experimental Research or b) Action Research (AR).

We need a process-oriented focus in our research approach, which would take into account the full richness of organizational interactions.
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